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09/966,299	09/27/2001	Nikolay V. Erukov	HUK-2003-1	5037
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RONALD & CORNELL 4901 Cremshaw Court Raleigh, NC 27614			EXAMINER MENON, KRISHNAN S	
			ART UNIT 1723	PAPER NUMBER

DATE MAILED: 04/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/966,299

Applicant(s)

ERUKOV ET AL.

Examiner

Krishnan S Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-24 and 28-38 is/are rejected.
- 7) ☒ Claim(s) 25-27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Claims 21-38 are pending.

#### *Priority*

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Russian Federation on 9/29/00 and 8/10/01. It is noted, however, that applicant has not filed a certified copy of both of the Russian applications as required by 35 U.S.C. 119(b).

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 21, 24, 35 and 37 are rejected under 35 U.S.C. 102(a/e) as being anticipated by Yang et al (US 5,976,432).

Claim 21: Yang teaches the improved process of mixing activated carbon and binder and extruding the mixture wherein the mixture is heated to above the softening point of the binder, molding to a porous element, and cooling the porous element with manipulation of the porous element to obtain increased

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porosity – see col 4 line 44 – col 5 line 3, col 5 lines 20-35 – manipulating to control porosity.

Claim 24: activated carbon is granular – see col 1 lines 10-20. Intensive agitation: carbon and binder are pre-mixed and then agitated in the screw – col 4 lines 44-67. Claim 37 – Yang teaches a porous element formed by the method of claim 21.

Claim 35 – hydraulic resistance of the porous element is an inherent property. The element in the reference is made the same way as in the claim, and therefore is anticipated to have the same hydraulic resistance. The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. “The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness.” *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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1. Claims 22, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al (US 5,976,432) in view of Hughes et al (US 6,267,887 B1) and Barboza et al (US 5,783,011).

Claim 22: Yang teaches a method of making a filter element comprising activated carbon and polymeric binder by extrusion as in claim 21. Claim 22 adds further limitation of a porous structure having increasing density from periphery to the center, which Yang does not teach. Hughes teaches a method of making a depth filter with activated carbon and binder and having fibrous material to develop the required porous structure for the depth filter (see fig 2 for flow path of depth filter 3; col 5 lines 29-45). Now, Hughes does not specifically teach that the depth filter has decreasing porosity or increasing density gradient in the direction of flow (or periphery to center). However, it is known in the art that depth filters have increasing density gradient in the direction of flow as taught by Barboza, col 1 lines 10-20. Hughes has direction of flow from periphery to center as seen in Fig 2. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Hughes and Barboza in the process of Yang to make a "depth filter" using activated carbon and binder.

Claim 36 – hydraulic resistance is an inherent property, since the element is made the same way by the references as claimed. *In re Napier*

Claim 38: Yang in view of Hughes and Barboza teaches a porous element.

2. Claims 23 and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al (US 5,976,432) in view of Chen et al (US 5,928,588).

Yang teaches all the limitations of claim 21. Instant claims add further limitations not taught by Yang, but taught by Chen '588 as follows:

The polymeric binder is introduced in the form of fibers as in claim 23, mixture of fibrous polymers as in claim 28, powder and fiber as in claim 30, polypropylene, polyamide, etc, as in claim 32, and 5 to 20 times length to diameter as in claim 33 (col 6 lines 22-58). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Chen in the teaching of Yang to have reduced binder content and increased separation material content without sacrificing strength (see col 2 lines 48-54, col 3 lines 1-10 and 31-39). Re claims 29 and 31, the melting point difference of at least 10 C and powder having a lower melting point than the fiber – these are considered equivalent to the mixture of fiber and powder of the same material because the description in specification page 7, 2<sup>nd</sup> paragraph, seem to indicate that they are equivalent; and the reference has the same materials for binder as in the specification/claims. In this case, the prior art element:

(A) performs the identical function specified in the claim in substantially the same way, and produces substantially the same results as the corresponding element disclosed in the specification. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 54 USPQ2d 1308 (Fed. Cir. 2000)

(B) is not excluded by any explicit definition provided in the specification for an equivalent. A person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification. *Caterpillar Inc. v. Deere & Co.*, 224 F.3d 1374, 56 USPQ2d 1305 (Fed. Cir. 2000); *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1316, 50 USPQ2d 1161, 1165 (Fed. Cir. 1999); *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus. Inc.*, 145 F.3d 1303, 1309, 46 USPQ2d 1752, 1757 (Fed. Cir. 1998); *Lockheed Aircraft Corp. v. United States*, 193 USPQ 449, 461 (Ct. Cl. 1977); *Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1 USPQ2d 2052 (Fed. Cir. 1987).

(C) is an equivalent of the claimed element. There are insubstantial differences between the prior art element and the corresponding element disclosed in the specification. *IMS Technology, Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1436, 54 USPQ2d 1129, 1138 (Fed. Cir. 2000); *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 117 S. Ct. 1040, 41 USPQ2d 1865, 1875 (1997); *Valmont Industries, Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 25 USPQ2d 1451 (Fed. Cir. 1993). See also *Caterpillar Inc. v. Deere & Co.*, 224 F.3d 1374, 56 USPQ2d 1305 (Fed. Cir. 2000) the prior art element is a structural equivalent of the corresponding element disclosed in the specification. In *re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). That is, the prior art element performs the function specified in the claim in substantially the same manner as the function is performed by the corresponding element described in the specification

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Claim 34: activated carbon has fibers of length 2 to 100 times the diameter: Chen teaches adding carbon fibers with carbon particles for providing additional properties and/or reducing cost (see col 6 line 59 – col 7 line 6). Carbon particles are added as primary separation media/capacity (col 4 lines 60-67, col 5 lines 7-12). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Chen in the teaching of Yang to have carbon fibers and particles to obtain additional capacity and/or reduce cost. Re the length to diameter ratio of 2 to 100, particle size in the reference is given as from 10-400 microns (col 5 lines 10-20). Actual particle size, length and diameter could be optimized based on handling or processability requirements, desired media capacity and cost. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955).

### ***Allowable Subject Matter***

Claims 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The closest references are Yang et al (US 5,976,432) in view of Hughes et al (US 6,267,887 B1). Claim 25 recites introduction of fibrous carbon



in the mix after intensive mixing of activated carbon and binder and then mixing at less vigorous agitation, which is not taught by the references, and it would also be not obvious to one of ordinary skill because even though Yang in view of Hughes teaches method of making a carbon block depth filter by blending fibers and powder carbon, the actual sequence of mixing is not taught by either references. Claim 26 recites a lower rotation velocity for the mandrel compared to that of the screw. The primary ref Yang teaches a mandrel that fits in to a cavity at the end of the screw, but does not teach if the mandrel rotates at a lower speed than the screw; it is also not obvious to one of ordinary skill in the art to think that the mandrel could be rotating at a lower speed. Claim 27 depends from claim 26.

### ***Response to Arguments***

Applicant's arguments filed 3/4/04 have been fully considered but they are not persuasive.

Applicant's arguments re the 112 rejection are moot because of cancellation of the rejected claims.

Applicant's main arguments are that examiner has combined unrelated arts to reject the claims and that the Yang ref is directed to a uniform product whereas the applicant has a non-uniform product. Examiner agrees that Yang reference teaches the process of making a uniform carbon block filter. Claims 22, 26 and 27 recite a process of making a carbon block having increasing porosity from inside to the outside. Ref Yang teaches how to make a carbon

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block by extrusion, albeit of uniform porosity. The secondary ref Hughes teaches how to make a carbon block as a depth filter, with the supporting reference Barboza teaching that the depth filter has increasing density in the direction of flow to perform as a depth filter (Barboza ref is used only to bring this fact out). How would these references become unrelated art? Re the question of uniformity, applicant's specification and claims describe a filter with a gradient in porosity from inside to the outside. Question is, is it possible to modify the extrusion process taught by Yang to make a carbon block depth filter from the teachings of the secondary references? The answer is yes. Hughes teaches the process of making a depth filter by having particular and fibrous materials combined with a binder, and then heating and compressing the mixture. Yang teaches the mixing, heating and compressing (by extrusion) process. Is there a motivation? Yes, one is interested in making a depth filter as taught by Hughes. Please note that claim 22 is not limited by any additional process steps, which are not taught by the combination of these references, necessary to bring about the inside-out decrease in density.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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